Olympic Coast
National Marine Sanctuary

Multibeam Bathymetric
Seafloor Survey

**Cape Flattery and
Cape Alava Area**

**Cruise Report
OCNMS-HMCR-103-2000-01**

Steven S. Intelmann
Habitat Mapping Specialist

115 E. Railroad Ave., Ste. 301
Port Angeles, WA 98362-2925

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1 INTRODUCTION

Washington Department of Fish and Wildlife (WDFW) contracted Evans Hamilton and the Naval Undersea Warfare Center Division at Keyport to conduct a multibeam survey and provide a survey platoform, respectively.

1-1 Area Surveyed

Two distinct areas within the boundaries of the Olympic Coast national marine sanctuary (OCNMS) were surveyed (Figure 1). The Cape Flattery block (within the OCNMS boundary) was approximately 15 km^2 in size, while the Cape Alava block was approximately 80 km^2. Water depth ranged from approximately 5m to 150m.
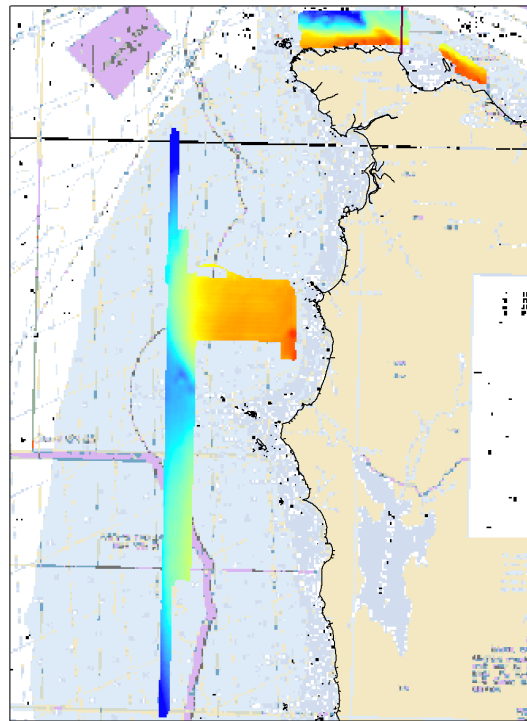

Figure 1. Location of Survey Area.

2 DATA ACQUISITION

2.1 Vessel

The 108' Navy YP 697 (Figure 2), based out of the Naval Undersea Warfare Center Division at

Keyport, WA, was used for the survey. Technical specifications for the vessel are located in Appendix B.

Figure 2. A YP 680 class training vessel similar to the YP697 used for this survey.

2.2 Equipment and Procedures
The multibeam system and logging software were leased from Seafloor Systems, Portland, OR. The Navy technicians at Keyport allegedly set up the system while Evans Hamilton directed the survey. Soundings were logged as HSX files in Hypack Max. Sonar offsets can be found in Appendix C.

2.2.1 Positioning
Vessel positions were determined with a differential global positioning system (DGPS). A Trimble Ag32 beacon was used (scanning for Coast Guard Amphritrite beacon). Positioning was logged in Hypack Max..

2.2.1.1 Project Datum
Positional information supplied by DGPS was in the WGS84 datum (Table 1) and all online survey was conducted using this datum. Data sets were projected to the universal transverse mercator (UTM) Zone 10 North projection (Table 2) for mapping and display. The vertical datum for the project was Mean Lower Low Water (MLLW).

Table 1. Datum Parameters

Datum	WGS84
Spheroid	WGS84
Semi-major axis	6378137.000
Semi-minor axis	6356752.314
Inverse flattening (1/f)	298.2572236
Eccentricity squared (e^2)	0.006694380

Table 2. Projection Parameters

Projection	Universal Transverse Mercator (UTM)
Zone	10 North
Unit	Meter
Latitude of Origin	0
Central Meridian (CM)	123 W
False Easting	500,000
False Northing	10,000,000
Scale Factor at CM	0.9996

2.2.2 Sounder
A 180 KHz Seabeam 1185 multibeam echosounder was used for the survey. Characteristics of the sounder include 126 individual beams, 1.5 degree beam width, and 153 degree swath width.

2.2.3 Gyro
Vessel attitude was determined with a Scan2000 gyro which was mounted near the gravitational center point of the vessel.

2.2.4 Motion
A TSS motion sensor was used to compensate for vessel heave, pitch, and roll.

2.3 Data Quality
I was told that latency problems were experienced, however a latency correction value was not

provided for addition into a VCF in Caris. The latency was allegedly minimal, however it did exist. Furthermore, conversations with the surveyors at Evans Hamilton indicated that sea state was unfavorable for acquiring multibeam data on this YP platform. Greater than 30 degree rolls were experienced while surveying the Cape Alava block which significantly affected data quality. Significant data thinning had to be undertaken in order to overcome misalignments. Swell was less of a problem while surveying the Cape Flattery area, therefore the data is of higher quality. Grids were created at 50m and 5m resolution for the Cape Alava and Cape Flattery areas, respectively.

3   DATA PROCESSING

3.1 Multibeam
Initial bathymetric data processing was done in Hypack Hysweep by Evans Hamilton. Soundings were exported as XYZ and provided to OCNMS. OCNMS has also acquired the HSX files and will attempt to import into Caris Hips for addition to our own bathymetric data set.

4   CHARTING AND DATA PRODUCTS

Grids were created from ascii XYZ data provided to OCNMS. Gridding was done at OCNMS using ESRI ArcView 3.2 software.

5   RESULTS

5.1 Multibeam
Two grid data sets were created at 5m and 50 resolution for the Cape Flattery and Cape Alava areas, respectively.

Appendix A. Daily Log Events

Not available. Was not provided by WDFW.

Appendix B. Vessel Specifications

YP 697 Vessel Specifications
Builders: Marinette Marine
Power Plant: 12V-71N Detroit diesel engines
        2 propellers
        horsepower rating 437 shaft horsepower @ 2,100 RPM
Overall Length: 108 feet (32.9 meters)
Waterline Length: 102 feet (31.1 meters)
Beam:24 feet (7.3 meters)
Draft: 8 feet (1.9 meters)
Speed: 12 knots (19.6 km/hr)
Cruising Radius 1800 nautical miles (3300 km)
Hull Material: Wood hull, aluminum superstructure.
Crew: Officers: 2 Enlisted: 4
Safe capacity: 50 people

Appendix C. Vessel Offsets for Sensors

1. Seabeam 1185
        X= -3.82
        Y= 5.57
        Z= 3.05
        Yaw= -4
        Pitch=2
        Roll=0

2. Ag32 DGPS Positioning (from RP)
        X= -1.93
        Y= -4.27
        Z= -6.65

Appendix D. List of Charts
None created.

Personnel
Kevin Redmond, Evans Hamilton (206)526-5622
Tom Jagielo, WDFW
Brian Bunge, Navy Keyport (360)396-1476